

DAFTAR PUSTAKA

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Definition of fishbone analysis, dipetik 26 November 2016 dari website :

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Gambar 1 : *Tugboat* mengambil tali
tambat dari kapal



Gambar 2 : Rantai terangkat ke kapal



Gambar 3 : Proses pengangkatan *hose*

Gambar 4 : Mesin *winch* MT.Pegaden



Gambar 5 : Kebocoran pipa hidrolic



Gambar 6 : Tali tambat di *Forecastle* MT.Pegaden



Serat tali yang rusak karena penanganan yang tidak benar

Gambar 7 : Kerusakan tali tambat



Gambar 8: *Wind Indicator* MT.Pegaden



Gambar 9 : Cuaca buruk pada tugboat



Gambar 10 : Draft Indicator rusak



Gambar 11 : SBM 17500 Balongan

Gambar 12 : Proses penarikan tali tambat



Gambar 13 : *Buoy Transfer*



Gambar 14 : *Bridge Team Maneuvering* saat proses penambatan di SBM



Gambar 15 : *Radio Handy Talky*



Gambar 16 : *Radio VHF*

SHIP'S PARTICULARS

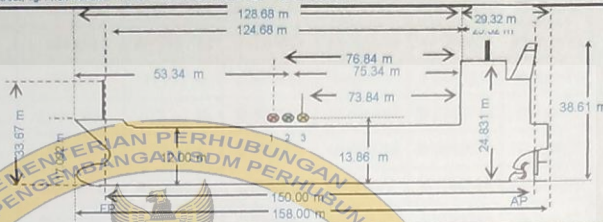
NAME	PEGADEN/P 1024
CALL SIGN	YUJI
FLAG	INDONESIA
PORT OF REGISTRY	JAKARTA
REG. NUMBER (BK)	6587
IMO NUMBER	9181883
CLASS SOCIETY	LR / BKI
CLASS NOTATION	NK : NS : "Tanker, Oil Flash Point below 60° C. MNS" /BK1 : +A100 I Oil Tanker, +SM
P & I CLUB	BRITANIA, UK

KEEL LAID	30th March 1998
LAUNCHED	27th May 1998
DELIVERED	31st August 1998
SHIPYARD	Sasebo Heavy Industries Co Ltd / S.439
	SASEBO SHIPYARD
	SASEBO JAPAN

SATELLITE COMMUNICATION		
	INM-B	INM-C
E-MAIL	ycii@amosconnect.com	
E-MAIL	mt.pegaden@yahoo.com	
PHONE	+870 773 238 978	
FAX	+870 352 500 025	
INM.B TEL	+870 352 500 024	
MMSI	525 008 044	
CS / FLAG	INDONESIA	

OWNERS	PERTAMINA SHIPPING, 32-34, Yos Sudarso Street, Tg. Priok - Jakarta. Phone : + 62-21-4393 5380 Fax : +62-21-4393 0441
OPERATORS	PERTAMINA SHIPPING, 32-34, Yos Sudarso Street, Tg. Priok - Jakarta. Phone : + 62-21-4393 5380 Fax : +62-21-4393 0441

PRINCIPAL DIMENSIONS	
LOA	158.00 m
LBP	150.00 m
BREADTH (Extreme)	27.70 m
DEPTH (molded)	12.00 m
HEIGHT (maximum)	38.61 m
BRIDGE FRONT - BOW	128.68 m
BRIDGE FRONT - STERN	29.32 m
BRIDGE FRONT - M'FOLD	75.34 m



TONNAGE	REGD	SUEZ
NET	4,063 T	N/A
GROSS	14,262 T	N/A
GROSS Reduced (Rt:13495)	N/A	N/A

LOAD LINE INFORMATION	FREEBOARD	DRAFT	DWT
TROPICAL	4.997 m	7.033 m	18,318 MT
SUMMER	5.140 m	6.890 m	17,781 MT
WINTER	5.283 m	6.753 m	17,245 MT
LIGHTSHIP	10.040 m	1.860 m	5,450 MT
NORMAL BALLAST COND	7.630 m	4.970 m	8,501 MT
SEG. BALLAST GOND	6.330 m	5.670 m	13,269 MT
DWT WITH SBT ONLY		13.269 MT	
FWA		1.784 m	
TPC @ Summer draft		37.48 MT	

TANK CAPACITIES (cbm)			
CARGO TANKS (95 %)		BLST TKS (100 %)	
COT 1 P	2409.0	COT 5 P	2409.0
COT 1 S	2414.0	WBT 1 P/S	1934.0
COT 2 P	607.0	WBT 2 P/S	2090.0
COT 2 S	606.0	WBT 3 P/S	2128.0
COT 3 P	2425.0	WBT 4 P/S	2120.0
COT 3 S	2465.0	WBT 5 P/S	2692.0
COT 4 P	2469.0	APT	397.0
COT 4 S	2465.0		
TOTAL	23107.0	TOTAL	12137.0

OTHER DETAILS			
H. Level Alarm	95%	Level gauge	DIR 700
Overfill Alarm	98.5%		

MACHINERY / PROPELLER / RUDDER	
MAIN ENGINE	Diesel Engine "B&W 6S33MOL" (set)
M.C.R.	4,192 KW (5700 PS) x 170.0 rpm
N.C.R.	3,773 KW (5,130 PS) x 164.1 rpm
MAX CRITICAL RANGE	82 - 99 rpm
AUX. BOILER (2 sets)	Thermal Oil Heater
GENERATOR (3 sets)	3 x 580 KW, 78A BHP @ 1
EMER D.G. (1)	1 x 99 KW (135 PS) 1,800 rpm
PROPELLER	fixed pitch serrated 5 blade Ø 4000mm
RUDDER	Streamlined type of double plate, 21 m ²
STEERING GEAR	Electric hydro 1 ram - 2 cyl
FW GENERATOR CAP	Alfa laval 10 ton/day

BUNKER TANKS 96%	
No.1 FO P	235
No.1 FO S	286
No.2 FO P	152
No.2 FO S	152
FO Srv & Sett	20
TOTAL	796 m ³
DOT (C)	118
DO Sett	3
DO Srv	3
TOTAL	124 m ³

WINCHES / WINDLASS / ROPES / EMERGENCY TOWING			
	FWD	AFT	PARTICULARS
WINCHES	2	2	Hydraulic, hauling spd 10 T x 15 m/min
MFG ROPE	7	7	Polypropylene rope, 70 mm dia x 220 m
Winch BHC	38 T	38 T	Hydraulic, hauling spd 10 T x 15 m/min
WINDLASS	2	N/A	Hydraulic, 16 T x 10 m/min
FIRE WIRE	1	1	25 mm x 2 x 45 mtr
ANCHOR	N/A	N/A	Stockless anch AC-14 type (4,208 kg)
			Anchor chain P/S Grade 3, dia 58x288,75 m
			Spare 1 units on main deck (4,208 kg)
			50 mm dia. x 220 m
EMG TOWING	1	N/A	

CARGO AND BALLAST PUMPING SYSTEM				
MAIN PUMPS	NO	CAPACITY	HEAD	RPM
CARGO OIL P/P's	3	600 m ³ /hr	100m	1750
STRIPPING PUMP	1	100 m ³ /hr	100m	1750
CARGO EDUCTOR	N/A			
BALLAST P/P's	2	300 m ³ /hr	20m	1750
BALLAST EDTR	1	75 m ³ /hr	13m	N/A

LIFE BOATS	
Type	SHIGI SZ-73TRS
	7.30m x 2.60m x 1.10m
	2 x 37 Persons
LIFE RAFTS	
	4 x 20 prsn, 1 x 6 prsn
PROV. CRANE (2nos)	
	1 set x 0.9 ton
	8 m/min
	outreach - 3.0 m

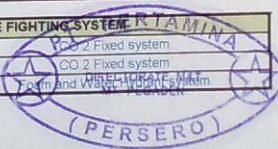
MANIFOLD ARRANGEMENT (400 mm / Steel)	
Distance of cargo manifold to cargo manifold	1500 mm
Distance of cargo manifold to vpr. return manifold	N/A
Distance of manifolds to ship's rail	5200 mm
Distance of spill tray grating to centre of manifold	900 mm
Distance of main deck to centre of manifold	1860 mm
Distance of main deck to top of rail	900 mm
Distance of top of rail to centre of manifold	5200 mm
Distance of manifold to ship side	5200 mm
Distance of manifold from keel	1386 mm

CARGO HOSE CRANES	
	1 set x 10 ton x 10m/min

IG / VAPOR EMISSION / VENTING		
IG BLOWER CAPACITY (3 nos)	N/A	
P/V VALVE PR / VAC. SETTING	0.14 kg/cm ² & -0.035 kg/cm ²	
P/V BREAKER PR / VAC. SETTING	N/A	

Min Bow Drft	1.80 m
Dist Drft	5.32 m, 8.03 m
MARPOL Trim	3.00 m
Propeller Immer	4.00m

FIRE FIGHTING SYSTEM	
E/RM	CO 2 Fixed system
PUMP ROOM	CO 2 Fixed system
CARGO/DK AREA	Form and Water based system



Lampiran 1 : Ship's Particulars

CREW LIST

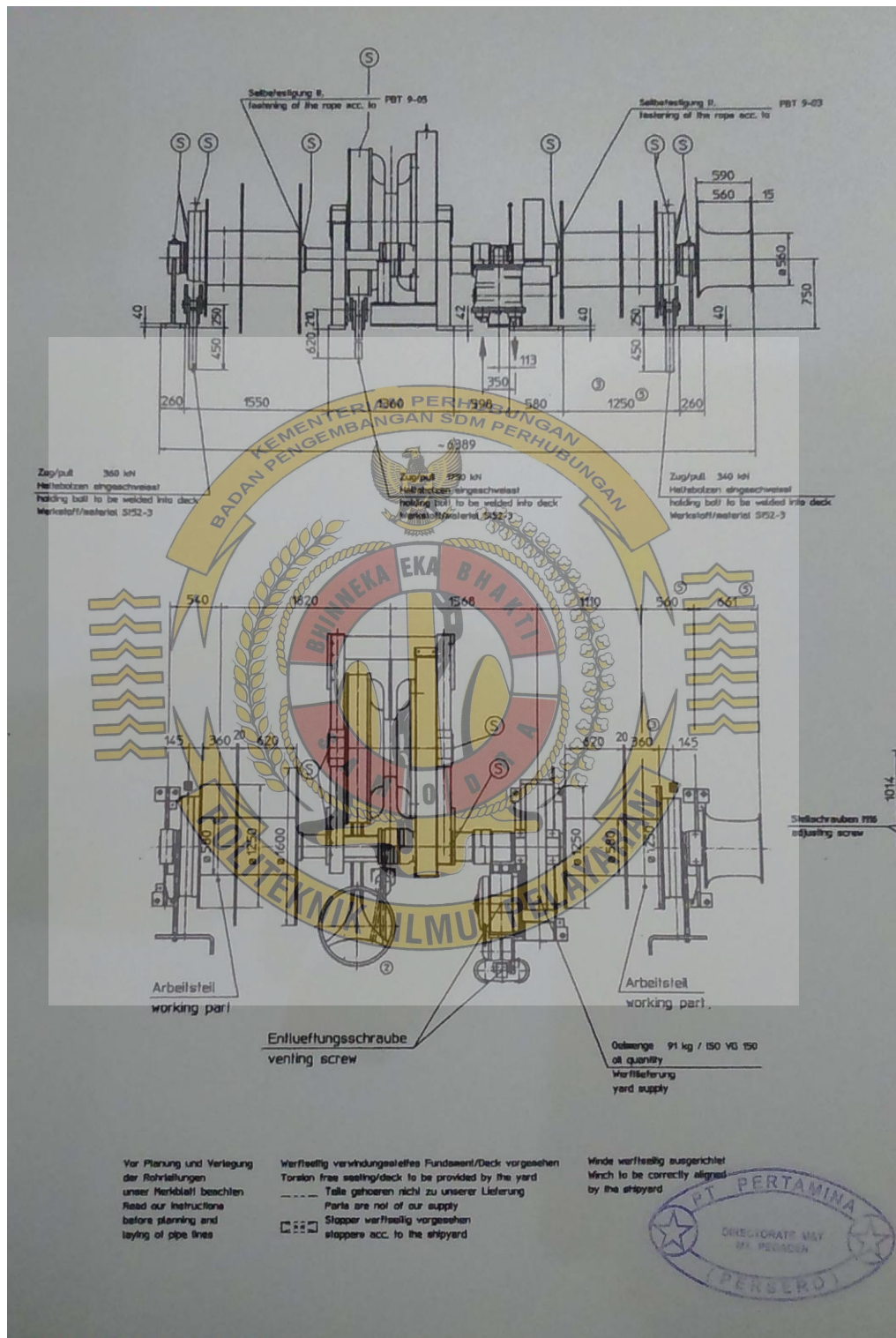


Name of Vessel : MT. PEGADEN Port of Reg. : JAKARTA Last port : Plaju
 Call sign : YCJI Owner : PT. PERTAMINA (PERSERO) Date : Februari 2015
 Gross Tonnage : 14.262 Ts IMO Number : 9181883 Port of : Balongan

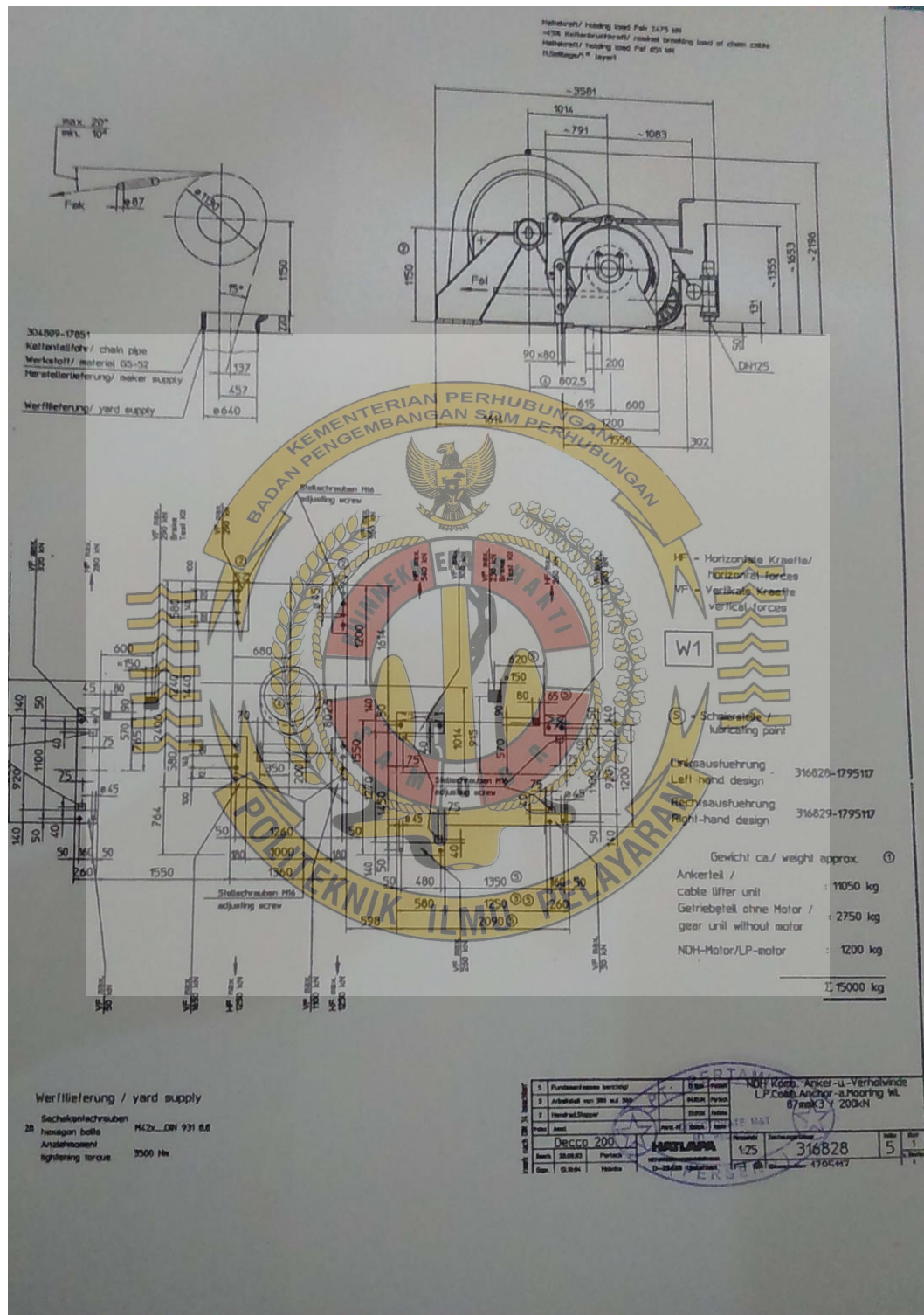
NO.	N A M E	RANK	NP / GOL	CERTIFICATE	SEAMAN BOOK	EXPIRED	PASSPORT	EXPIRED	SIGN ON
1	Capt. Petrus Wattimena	Master	10013961	ANT I / 06	A 013032	6-Feb-17	A 2459653	27-Mar-17	11.04.15
2	Salahuddin Akhmad . Y	Chief Officer	747925	ANT II / 08	W 066157	6-Dec-16	B 0617783	24-Feb-20	20.03.15
3	Firman Zulswan	2nd. Officer	10013798	ANT II / 14	A 031818	10-Apr-17	A 8609262	17-Jul-19	04.03.15
4	Achmad Syapel	3rd Officer	751574	ATT III / 13	Y 035648	11-Apr-16	W 791636	31-Jan-16	05.07.15
5	Serfis Frida Sipahutar	Chief Eng.	749374	ATT I / 12	C 055712	1-Apr-17	A 8046310	24-Apr-19	09.07.15
6	Jujun Junaedi	2nd. Eng	10013965	ATT II / 13	D 026313	27-Nov-17	B 0355785	28-Jan-20	18.03.15
7	Andarias Tandianan R	3rd. Eng.	750904	ATT II / 13	D 055233	10-Mar-18	B 0912771	16-Apr-20	14.05.15
8	Fahri Winanda	4th. Eng.	10013284	ATT III / 10	D 009525	8-Oct-17	W 398766	23-Dec-15	21.11.14
9	Danang Priyambodo	Electrician	10013276	BST / 13	B 086232	15-Jul-16	A 2781086	20-Apr-17	13.11.14
10	Indra Gunawan	Boatswain	10014369	ANTD / 02	B 061965	23-Apr-18	A 4967034	20-Mar-18	04.06.15
11	Hariyanto	Pumpman	10014538	ANTD / 02	X 010858	14-Jan-17	A 4814930	19-Feb-18	05.07.15
12	Julio Gelen Alexander S	Q. Master	10013756	ANTD / 12	B 059592	12-Apr-16	B 0355291	22-Apr-20	07.02.15
13	Muchamad Arif	Q. Master	10013448	ANTD / 13	W 061903	21-Aug-16	W 216251	11-Nov-15	11.12.14
14	Sholihin Bin Surya	Q. Master	10013366	ANTD / 02	B 034600	22-Jan-16	A 2458628	21-Mar-17	05.12.14
15	Jandro Ronaldo Ferdy L	Sailor	10014495	BST / 11	Y 074072	15-Sep-16	A 1451085	4-Oct-16	05.07.15
16	Deni Ismatt	Sailor	10014205	ANTD / 08	C 050029	14-Mar-17	A 1482546	25-Oct-16	06.05.15
17	Slamet Teguh	Sailor	10013282	ANTD / 08	C 019962	30-Oct-16	A 3405408	1-Aug-17	13.11.14
18	Arif Setiawan	Foreman	10013441	ATTD / 02	B 039127	28-Jan-16	A 6940334	18-Dec-18	17.12.14
19	Djaini	Oiler	10013431	ATTD / 11	V 083516	22-Oct-15	A 9592983	13-Nov-19	11.12.14
20	Chaerudin	Oiler	10014604	ATTD / 02	W 014544	20-Jan-16	A 2180574	15-Feb-17	09.07.15
21	Beni Jermy	Oiler	10014603	ATTD / 03	C 005582	25-Sep-16	A 8066837	19-May-19	09.07.15
22	Wandi .M	Chief Cook	10013287	BST / 10	C 085973	26-Aug-17	A 8768704	28-Aug-19	05.12.14
23	Sumitra	2nd Cook	10013667	BST / 12	B 089616	19-Aug-16	B 0143898	15-Dec-19	21.01.15
24	Agus Wiyoto	Washman	10013496	BST / 10	W 058304	16-Aug-16	A 7376675	24-Jan-19	18.12.14
25	Faqih	Messboy	10013404	ANTD / 12	Y 088267	14-Nov-16	A 5292760	16-Apr-18	11.12.14
26	Yulina Ruffaida	Deck Cadet	20140148	BST / 13	C 061804	31-May-17	A 7897620	3-Apr-19	31.08.14
27	Anindya Rahmatika .A	Deck Cadet	20140156	BST / 13	C 061854	02-Jun-17	A 7904329	21-Apr-19	31.08.14
28	Dzulfikar Try Eryanto	Engine Cadet	20140182	BST / 13	C 061933	9-Jun-17	A 8182175	9-May-19	07.10.14
29	Dhean Arya Pratama	Engine Cadet	20140200	BST / 13	C 088580	1-Sep-17	A 7991490	22-May-19	05.12.14

Master
 PT. PERTAMINA
 DIRECTORATE M&I
 MT. PEGADEN
 (PERSERO)
 Capt. Petrus Wattimena

Lampiran 2 : Crew List



Lampiran 3 : Winch Structure



Lanjutan Lampiran 3 : *Winch Structure*

Form Number: 5.03 Navigational Checks Prior to Arrival

Vessel/Office:

Port: **BALONGAN** Date: **04-02-2015**

Checks prior to arrival	Select Yes or No or N/A	If No, Select Appropriate Record
Has a Pilot Information Exchange card been prepared?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Have all clocks been synchronized?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Have all relevant charts and nautical publications been corrected?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Have local current and tidal information been consulted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Have local port rules and regulation been consulted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Have the latest navigational notices been received and noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Has an ETA been sent with all relevant information required by local regulations?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Has the Pilot Station been notified of the ETA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is all navigational equipment working and in good order?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Have the engines (ahead and astern as applicable) been tested and prepared for maneuvering?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Have the engineers been informed at least one hour prior to arrivals to standby for maneuvering?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Has manual steering been engaged and tested in sufficient time for the helmsman to become accustomed prior to commencement of maneuvering?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Are both steering gears running if capable of simultaneous operation? SOLAS Chp 5 Reg 24 and 25?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Have all crew been notified of standby time for entering port?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Have VHF channels for the various services (VTS, pilots, tugs, berthing master) been noted and a radio check carried out?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Have the pilot embarkation arrangements been prepared?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Has an emergency contact list been posted in all required locations?	<input checked="" type="checkbox"/>	<input type="checkbox"/>

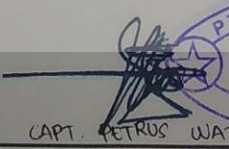

Lampiran 4 : *Form Arrival Checklist*

Low Time	—	High Time	—
Low Tide	—	High Tide	—
Expected currents	Easily 0.5 kt		
Forecast weather	moderate sea.		
Details of the Passage Plan, Including Abort Points and Emergency Plans			
Regulations, Including VTS Reporting, Anchor/Lookout Attendance, Max Allowable Draft			
Other Important Details Including Navigation Hazards and Vessel Movement			
Vessel's Particulars			
Vessel Name	MT. PEGADEN	Call Sign	YCJI
Displacement (tonnes)	6623	Deadweight (tonnes)	17500
Year built	1998	LOA (M)	158
Beam (M)	27.7	Bulbous bow	YES
Draught fwd (M)	5.6	Draught aft (M)	5.8
Draught amidships (M)	5.9	Port anchor (shackles)	9 (NINE)
Starboard Anchor (shackles), (1 shackle = 27.4 m/15 fathoms)		10 (TEN)	
Pilot Card Distances			
Length of the parallel body at the waterline in loaded condition in meters			150
Length of the parallel body at the waterline in ballast condition in meters			158
Length from center of the manifold to the bow in meters			53.34
Length from front of accommodation block to the bow in meters			124.68

Lanjutan Lampiran 5 : Form Pilot Card

Length from front of accommodation block to the stern in meters		29.32	
Extreme breadth of the vessel in meters		27.7	
Air draught in meters		33.1	
Air draught in feet		105.4	
Height from the keel to the highest point of the vessel in meters		38.61	
Engine			
Type of engine	DIESEL	Maximum power (kW)	4,192
Maximum power (HP)	5617.28		
	RPM Pitch	Loaded Speed (kts)	Ballast Speed (kts)
Full ahead	130	10	11
Half ahead	102	8.5	9.2
Slow ahead	78	6.5	7.0
Dead slow ahead	60	5.0	5.4
Dead slow astern	60		
Slow astern	78		
Half astern	102		
Full astern (% of full ahead power)		90	
Maximum number of consecutive starts	20	Engine critical rpm	82 - 99
Time to full ahead to full astern (min)	16.31	Time limit astern (minutes)	2.16
Steering			
Number of Rudders	1 (ONE)	Type of Rudders	STREAMLINED-DOUBLE PLATE
Maximum Angle of Rudders	35	Time hard-over to hard-over (sec)	26
Rudder angle for neutral effect	0	Draught fwd (m)	5.6
Draught aft (m)	5.8	Draught amidships (m)	5.7
Propellers (number)	1 (ONE)	Direction of turn	RIGHT
Controllable pitch	NO	Thrusters (number)	N/A
Bow power (kW)	N/A	Bow power (HP)	N/A
Stern power (kW)	N/A	Stern power (HP)	N/A
Steering idiosyncrasies	COURSE STOP 3 knots		
Equipment Checked and Ready for Use			
Anchors	✓	Cleared away	✓

Lanjutan Lampiran 5 : Form Pilot Card

X-Band radar	GOOD	ARPA	YES (NO.1)
S-Band radar	N/A	ARPA	N/A
Speed log	GOOD	Water Speed	DUAL AXIS
Echo sounder			
Electronic position-fixing	GOOD	Type	G P S
Compass system	GOOD	Gyro compass error	GOOD
Steering gear	GOOD	Number of power units in use	2 (TWO)
Rudder/RPM/ROT indicators	GOOD	Engine telegraphs	GOOD
VHF	GOOD	Mooring winches and lines	NOT GOOD
Equipment Operational Defects			
~			
Other Important Details			
~			
Equipment Defects Relevant to Safe Navigation			
~			
Other Important Details: Berthing Instructions, Maneuvering Peculiarities			
~			
*** Please select the records listed below if appropriate ***			
Additional comments and observations			
~			
Signature of Master	  CAPT. PETRUS WATTIMENA		

Lanjutan Lampiran 5 : Form Pilot Card